

Customer No.: 31561  
Application No.: 10/604,271  
Docket No.: 10109-US-PA

**REMARKS**

**Present Status of the Application**

Claims 1-10 remain pending of which claims 1-10 have been amended to more explicitly describe the claimed invention. The amendments to claims 12 and 20 are fully supported at paragraph [0023]. Therefore, it is believed that no new matter adds by way of amendment to claim 20 or otherwise to the application.

In the outstanding Office Action, title of the invention was objected for not being fully descriptive; specification was rejected under 35 U.S.C. 112, first paragraph for not being full, clear, concise and exact; the abstract was objected to for not being properly descriptive, claims 2-6 and 10 were objected because of some minor informalities; claims 3-10 were rejected under 35 U.S.C. 112, first paragraph, for failing to comply with enablement requirement; claims 4-5 and 8-9 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention; claims 1-2 were rejected under 35 U.S.C. 102(e) as being anticipated by pierrat et al. (US-2002/0127479, hereinafter Pierrat); and claims 3-10 were rejected under 35 U.S.C. 103(a) as being unpatentable over Pierrat in view of either Posshenrieder et al. (US-5,815,247, hereinafter Posshenrieder) or Tu et al. (US-6,150,058, hereinafter Tu).

For at least the following reasons, Applicant respectfully submits that claims 1-10 are in proper condition for allowance. Reconsideration is respectfully requested.

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Discussion of Objections to Specification

- 1. The Office Action objected to the title of the invention for not being fully descriptive.*

In response thereto, Applicants would like to thank the Examiner for pointing out the informality and accordingly amended the Title of the Invention as suggested by the Examiner. Reconsideration is respectfully requested.

- 2. The Office Action rejected the specification under 35 U.S.C. 112, first paragraph for not being full, clear, concise and exact.*

In response thereto, Applicants would like to thank the Examiner for pointing out the informality and accordingly amended the Specification. Reconsideration is respectfully requested.

- 3. The Office Action objected to the abstract for not being properly descriptive.*

In response thereto, Applicants would like to thank the Examiner for pointing out the informality and accordingly amended the Abstract. Reconsideration is respectfully requested.

Discussion of Objections to Claims

*The Office Action objected to claims 2-6 and 10 because of some minor informalities.*

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In response thereto, Applicants would like to thank the Examiner for pointing out the informality and accordingly amended claims 2-6 and 10 and corrected the informalities. Reconsideration is respectfully requested.

Discussion of the claim rejection under 35 USC 112

*1. The Office Action rejected to claims 3-10 under 35 U.S.C. 112, first paragraph, for failing to comply with enablement requirement.*

In response thereto, Applicants would like to thank the Examiner for pointing out the informality and accordingly amended claims 3-10. Reconsideration is respectfully requested.

*2. The office Action rejected claims 4-5 and 8-9 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.*

In response thereto, Applicant would like to thank the Examiner for pointing out the informality and accordingly amended claims 4-5 and 8-9. Reconsideration is respectfully requested.

Discussion of the claim rejection under 35 USC 102

*The Office Action rejected claims 1-2 under 35 U.S.C. 102(e) as being anticipated by pierrat et al. (US-2002/0127479, hereinafter Pierrat).*

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Applicants respectfully disagree and traverse the above rejections as set forth below. Applicants respectfully submit that the proposed independent claim 1 has been amended to recite as follows.

*Claim 1. A photomask with an internal assistant pattern, comprising:*

*at least a first pattern comprising a plurality of parallel lines along a first direction;*

*at least a second pattern comprising a plurality of parallel lines along a second direction that is different from the first direction; and*

*an internal assistant pattern comprising a shaped structure formed in said first pattern, wherein said second direction is perpendicular to a common line of two light exit apertures used for exposing the photomask.*

Accordingly, Applicants respectfully submit, and also as the Office Action admitted that Pierrat substantially fails to teach or disclose at least an opaque panel having two opaque light exit apertures and a photomask having plural sets of parallel lines oriented in different directions as recited by the amended proposed independent claim 1, and therefore, Pierrat cannot possibly anticipate the amended proposed independent claim 1 in this regard.

Furthermore, because claim 2 depends from claim 1, therefore, claim 2 also patently define over Pierrat for at least the same reasons above.

For at least the foregoing reasons, Applicant respectfully submits that claims 1-2 patently define over Pierrat. Reconsideration and withdrawal of above rejections is respectfully requested.

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Discussion of the claim rejection under 35 USC 103

The Office Action rejected claims 3-10 under 35 U.S.C. 103(a) as being unpatentable over Pierrat in view of either Posshenrieder et al. (US-5,815,247, hereinafter Posshenrieder) or Tu et al. (US-6,150,058, hereinafter Tu).

Applicants respectfully disagree and traverse the above rejections as set forth below.

The present invention is directed to a light projecting system. The independent claim 3, among other things, recites at least [*a photomask comprising: a first pattern comprising a plurality of parallel lines along a first direction; a second pattern comprising a plurality of parallel lines along a second direction, wherein the second direction is different from the first direction, wherein at least parallel lines of said first or second pattern are positioned parallel to said common line; and an internal assistant pattern comprising a shaped structure formed in one of said first or second patterns positioned parallel to said common line, so that said first and second patterns are transferred to a surface of a photoresist layer by a single exposure step*]. The advantage of the above features is that at least the reliable patterns of said first and second patterns could be effectively transferred to a surface of a photoresist layer by a single exposure step and thereby increase the throughput and reduce the overall fabrication cost.

Applicants would like to point out that Pierrat, at paragraph [0009], substantially teaches that phase shift masking technique is commonly applied to create small dimension features in integrated circuits. However, the extension of the phase masking to

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more complex designs results in a large increase in the complexity of the mask layout problem. For example, when laying out phase shift areas on dense designs, phase conflicts occur. One type of phase conflict is located in the layout at which two phase shift windows having same phase are laid out proximity to a feature to be exposed by the masks, such as overlapping of the phase shift windows intended for implementation of adjacent lines in the exposure pattern. In other words, Pierrat substantially teaches that phase conflict occurs when exposing a pattern having a plurality of parallel lines that extend along the same direction. In order to remedy this problem, Pierrat substantially proposes a method of applying assistant features in the pattern layout having parallel lines as described at paragraphs [0179-0180] with reference to FIG. 21-22.

While Posschenrieder, at lines 42-55 of col. 2, substantially teaches that the use of phase shift technique (optical proximity correction) for improving the resolution of the photolithography is costly, and proposes a method of using an off-axis illumination technique in which multiple exposures are carried out using dipole illumination mode, wherein the aperture plate is rotated by 90° between two exposures.

Furthermore, Tu, at lines 14-30 of col. 4, also substantially teaches an off-axis illumination technique which is different from Posschenrieder, in which binary patterns are formed at the locations where a pattern having plural parallel lines (extending in one direction) with very small spacing between adjacent parallel lines.

Therefore, it is clear that Pierrat, Posschenrieder and Tu all teach various techniques (or approach) for improving resolution of the photolithography for forming very fine patterns having plural parallel lines. Since the techniques of Pierrat,

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Posschenrieder described above are all related to improving resolution of the photolithography for forming very fine patterns having plural parallel lines, and therefore each individual technique is complete and functional by itself, and therefore there is no reason to use parts from or add or substitute parts from another reference such as Poscchenrieder or Tu, and certainly not to modify Pierrat in the manner only suggested by the Examiner because any such modification of Pierrat will frustrate its intended purpose. Accordingly, Applicant respectfully submit that AT BEST, these techniques described above may provide a choice to one skilled in the art from which one skilled in the art would feel reasonable to choose any one of the techniques (or approaches) (taught by Pierrat, Posschenrieder and Tu) if improvement of resolution of the photolithography for forming very fine patterns having plural parallel lines is desired.

The fact that Pierrat, Posschenrieder and Tu teach improvement of resolution for patterns with closely spaced parallel lines directed in only one direction, wherein Pierrat substantially teaches applying assistant features in the pattern layout having parallel lines extending in only one direction (having same phase), and Posschenrieder substantially teaches an off-axis illumination technique and one exposure step for each pattern layout having parallel lines oriented in a particular (one) direction relative to the common line of the light exit apertures, and Tu teaches using binary patterns in pattern with closely spaced parallel lines directed in only one direction. Therefore, Posschenrieder or Tu (or Pierrat) cannot possibly teach or suggest one skilled in the art to apply the assistant features of Pierrat (or binary pattern of Tu) in those patterns with plural parallel lines extending in directions (relative to the common line of the light exit apertures) different

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from those patterns with plural parallel lines directed perpendicular relative to the common line of the light exit apertures.

Thus, Pierrat, Posshenrieder and Tu substantially fail to teach, suggest or hint a light projecting system comprising at least [*a photomask comprising: a first pattern comprising a plurality of parallel lines along a first direction; a second pattern comprising a plurality of parallel lines along a second direction, wherein the second direction is different from the first direction, wherein at least parallel lines of said first or second pattern are positioned parallel to said common line; and an internal assistant pattern comprising a shaped structure formed in one of said first or second patterns positioned parallel to said common line, so that said first and second patterns are transferred to a surface of a photoresist layer by a single exposure step*] as required by the proposed independent claim 3, and therefore Pierrat, Posshenrieder and Tu cannot possibly render Claim 3 obvious in this regard.

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Because the amended proposed independent claim 7 also recite features that are similar to the amended proposed independent claim 3, therefore Applicants similarly submit that claim 7 also patently defines over Pierrat, Posschenrieder and Tu for at least the same reasons discussed above.

Claims 4-6 and 8-10, which directly or indirectly depend from independent Claims 3 and 7, respectively, are also patentable over Pierrat, Posschenrieder and Tu at least because of their dependency from an allowable base claim.

For at least the foregoing reasons, Applicant respectfully submits that claims 3-10 patently define over Pierrat, Posschenrieder and Tu. Reconsideration and withdrawal of above rejections is respectfully requested.

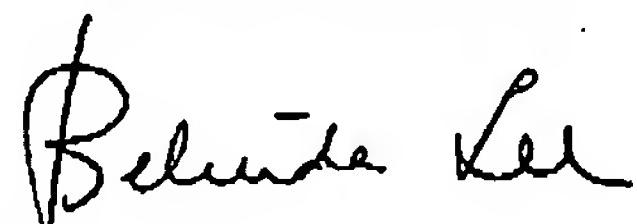
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**CONCLUSION**

For at least the foregoing reasons, it is believed that all pending claims 1-10 are in proper condition for allowance. If the Examiner believes that a conference would be of value in expediting the prosecution of this application, he is cordially invited to telephone the undersigned counsel to arrange for such a conference.

Respectfully submitted,

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